MISSOURI BOTANICAL GARDEN

Bulletin

May 1961
Volume XLIX
Number 5

COME THROUGH THE GARDEN GATE
AN EXHIBITION AND SALE

Flowering Shrubs, Plants, Ground Cover, Trees and Garden Accessories
Free Advice from Shaw's Garden Experts

HERB CAFÉ

All Proceeds Benefit Shaw's Garden
East Parking Lot Famous-Barr, Clayton, Forsyth and Jackson

Thursday, May 11	9:30 to 9:30
Friday, May 12	9:30 to 9:30
Saturday, May 13	9:30 to 5:30

Sponsored by the Women's Association of Shaw's Garden

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Through the Garden Gate

Missouri Botanical Garden Programs

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Missouri Botanical Garden Bulletin

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WEEDS

F. W. WENT

If you want a lively argument, start talking about weeds. No two persons will agree on which plants are weeds. The best one can do is to define them in a negative sense: plants which are not wanted. Therefore a larkspur or a poppy are weeds in a vegetable garden, whereas turnips overlooked in harvesting are weeds in any place except in a turnip patch. Still, these are not the plants we think of when we hear the word *weed*. Names like pigweed, sow thistle, pimpernel, purslane, plantain, mallow, Bermuda grass and other grasses come to mind. Wherever the climate is favorable for their growth, they have become backaches for farmers and gardeners.

Weeds are very much as sparrows or rats among the plants. Everywhere in the world where man has arrived, sparrows and rats have accompanied him, ready to partake of the best intended for other animals or for man himself. Weeds also seem to have the exasperating almost infallible habit of finding the best prepared and richest portions of a garden. This becomes all the more maddening since generally these weeds are not found outside the garden or the cultivated field. Many of our weeds are natives from other parts of the world, especially from Europe. If the climate suits them, why have they not generally spread to the wild here?

Two of the main reasons are, that they need a rich soil for growth, and that they only sprout where soil has been recently turned. Their seeds do not germinate where they have to compete with existing vegetation. This is especially true for the wild tobacco: when sown between other plants not a single seedling will come up, but where the soil is frequently turned over, such as on shoulders of roads, it germinates freely. Wild tobacco does not require rich soil, and since it is big and easily removed it is no pest in the garden.

We really should distinguish between garden weeds and weeds in field crops. Let us first talk a moment about the latter. They usually are brought into the field by the farmer himself with his seed supply. Many of the weeds of, for instance, wheat fields, have seeds of about the same size as wheat kernels. That is why they are hard to separate from the wheat. They are harvested with the wheat because those weeds grow at the same rate, reach the same length, mature at the same time and release their seeds only after thrashing. It is very likely that as man developed wheat from a wild ancestor, by selection of the highest-

yielding strains, he unconsciously selected the weeds also: when he obtained a taller variety, all weeds not growing so tall were eliminated, but those growing as high as the wheat remained a weed. That this actually must have happened can be concluded from a remarkable observation from Russia. In hand-harvested flax fields a weed with small seeds occurred, which was eliminated through the screens of the newly introduced mechanical harvester. Within a few years a new variety of this weed had developed with larger seeds, which did not pass the screen of the harvester. In this way this plant survived as a weed.

There exists only one field crop, to my knowledge, which is naturally weed-free at harvest time. This is rice. It is weed-free because of the remarkable method of cultivation, developed in the dim twilight of civilization by natives of the Far East. Rice is one of the few land plants which tolerate growing with their roots in completely water-logged soil. During the first few months rice is grown in inundated fields. There only water plants can grow as weeds between the rice plants. When the water is drained off the field about one month before harvest, these water weeds die, and ordinarily land weeds have no chance to germinate, grow and mature in time to be harvested with the rice.

Cultivating and hoeing is, in many field crops, the method used to remove weeds. I heard an advocate of frequent soil cultivation bless the weeds, which forced the farmer to stir his soil a few times yearly, since "stirring the soil is the foundation of good farming." This can be overdone, of course, but only few people go so far as to call cultivation the "Plowman's folly."

Now we will return to the vegetable garden weeds. Why should we get rid of them? Why not give them the benefit of the saying "live and let live"? In the first place they parasitize on the nutrients put in the soil for those plants which are wanted. Whatever nutrients weeds absorb are not available for our crops. In the second place weeds are usually strong plants, which can crowd out or overshadow the vegetables and thus diminish the harvest. In the third place their presence by itself may have a harmful effect on the crop. It is alleged, for instance, that Bermuda grass inhibits growth of Citrus trees, while other weeds do not have such harmful effect. In the fourth place, where water is precious, weeds should be eliminated, since they squander water. In the fifth place, which is perhaps the most important, many weeds harbor pests, which from there can invade your garden plants and vegetables, sometimes carrying diseases which can be transmitted to crops. As examples, some virus diseases and blight of tomatoes and potatoes can be mentioned. They occur on weeds like nightshade, and can spread from those weeds to healthy tomatoes; the club root disease of cabbage, cauliflower and turnip thrives equally well on wild mustard and related weeds. Therefore, this disease may survive in weeds, while the parasite would have died from starvation if

those weeds had not played host to them. For these reasons weeds have to be controlled.

Generally speaking, chemical control of weeds in gardens is only possible where a poison can be applied which will not harm other plants or animals. But if a substance is poisonous for one creature, it usually is toxic for others too. Therefore chemical weed control is mainly practiced to keep lawns, paths, roads, tennis courts, etc., free from weeds. The simplest method except for lawns is to apply large quantities of ordinary salt. This has the disadvantage that eventually it is washed out by rain and becomes ineffective. Sodium chlorate is often used: much smaller quantities suffice, and it does a more thorough job, but its effects are also not permanent. Permanent poisons like arsenic compounds are too dangerous for general use. The sodium chlorate has been used for weed control in pasture lands; by carefully adjusting the dosage it was possible to keep down certain weeds, while the grasses were not harmed. But for your vegetable garden such chemicals are not suitable. Therefore, if you have weeds, hoe or pull them out. But you can do a lot to keep the weeds down by following these suggestions:

1. Keep your garden clean, so that no new weed seeds are produced. Weed seeds, however, remain alive for years in your soil, so that many years after you have started a campaign against weeds they continue to come up. But eventually those hang-overs from a period of less gardening activity will disappear.

2. Sow weed-free seed. Seed from reputable seed houses is carefully cleaned and can be used with safety.

3. Use weed-free manure. Fresh manure is the worst enemy of a clean garden: it is chock-full of weed seeds. When this manure has been properly composted or fermented by mixing it with leaves, straw and other plant remains, it will have heated sufficiently to destroy all seeds.

4. Let soil be fallow for a short time, keeping the surface wet. Many seeds in the surface layers will germinate and the young seedlings are easily removed by shallow discing or hoeing. For as soon as a seed has germinated, it loses all its resistance against drought, heat or wounding.

5. In addition to its other advantages, transplanting of young plants from seed beds to the field decreases the weed problem: often the transplanted plants have a sufficient head-start over the weeds, which have to start right at the beginning, so that they are not so much bothered by the weeds.

6. Use an excess of seeds when sowing, and later thin the young plants. As mentioned in the beginning, weeds only thrive where there is no competition with other plants during their germination. Carrots sown thickly will be much freer from weeds than carrots sown thinly. In the latter case they may even be crowded out by weeds before you have time to attend to them.

Sometimes weeds are grown on purpose, and then they are called cover crops. They are used here especially in winter in orchards. Then they are

turned under in the spring. By sowing a cover crop a farmer can insure the growth of beneficial weeds, whereas the cover crop itself prevents the growth of other weeds. By using leguminous plants as cover crop the soil can be enriched in nitrogen.

In the tropics many tree-crops are grown together with cover crops. They prevent excessive erosion, keep harmful weeds out, make frequent cultivation unnecessary, form a good permanent mulch and thus keep the soil porous.

Whether one thinks that weeds are a blessing in disguise, or a mere nuisance; whether they are tolerated or persistently removed, one thing is certain: weeds are most interesting from a botanical standpoint and they deserve much more research. As an illustration of this I want to mention research carried out in Java. There it was tried to determine, with the aid of soil analysis, which varieties of sugar cane could be expected to do best in certain fields. This turned out to be very difficult. But the weeds growing in such fields gave an excellent clue for the suitability of those fields for specific cane varieties. This is not surprising: after all weeds require the same nutrients as other plants, and they are very sensitive to good soil, so that they can be used as indicators of good soils. Our own pigweed can be used more or less in this way. It grows almost exclusively where the soil is rich in nitrogen, so that when you have much pigweed growing in certain areas of your garden, you do not need to fertilize with nitrogen-fertilizer in those spots.

NOBILE TYPE DENDROBIUM HYBRIDS

PETER SMITHERS, D.PHIL., M.P.

THE Missouri Botanical (Shaw's) Garden is one of very few places in the world where a large quantity of these fine orchids may be seen in cultivation. The Nobile hybrids were the symbol of an age of luxury and elegance which has passed away. At the end of the last century and until the outbreak of the second world war they were extensively cultivated in the largest and most stately of the stately homes of England. They are, indeed, the orchids par excellence for lavish and exotic display. Capable of being grown into enormous specimens, they have left in orchid history numerous records of plants carrying more than a thousand flowers. Such an object was the ideal decoration for a great staircase hall, which it would fill with a subtle fragrance and a yet subtler atmosphere of wealth and good taste. There was a further advantage. In an age when men of fashion commonly wore a buttonhole flower, the individual *Dendrobium* bloom was ideal for the purpose. Correct in size at about three and a half inches, elegant in shape, the rich colours sharply set off by the large deep maroon blotch of velvety texture which adorned the lip, it exactly fitted the man of distinction of Edwardian days.

But for other purposes the Nobiles

were not commercial cutflowers. Growing on short pedicels set all along the growths, the flowers could only be offered for sale by cutting the whole pseudobulb. Although this is now being done experimentally in Germany it has hitherto been thought too weakening to the plant for adoption as a glasshouse cultural practice. So it was that with the passing of the stately homes, and of the kind of society in which men commonly adorned themselves with orchids, the Nobile type *Dendrobium* entered a period of obscurity. The second world war saw the breakup of nearly all the big private collections or orchids, and after the war those which remained were compelled to concentrate upon genera which are good market cutflowers. Only in the famous Schroder collection at Dell Park, and in literally one or two others is there still a '*Dendrobium* House.'

Yet, curiously enough, the Nobiles are ideal for the small amateur such as myself, who does not aim at paying his costs by selling flowers. They bloom in the worst weather of the year between Christmas and Easter. Unlike so many orchids, the plants as a whole are pleasing objects for house decoration: they bloom all over and carry the right amount of attractive foliage. They grow at relatively low temperatures and thus are economical in fuel. They are very free and reliable bloomers if given a cool enough autumn rest, that is to say, below 55 degrees F. If grown upright on the stage, they occupy very little space in a small greenhouse, yet they will luxuriate in baskets as may be seen at Shaw's Garden. The flowers last about three weeks, and with a little ingenuity the plants may be brought on in succession for three months.

Development of these hybrids has taken place over a period of about a century. The collection at Shaw's Garden is of particular interest in that it contains a number of plants of very early origin. Although these are far less showy than the magnificent modern hybrids, and for this reason have disappeared from cultivation elsewhere, their preservation is fortunate since it enables the evolution of the plants to be seen and studied.

After the first world war, the Garden had a considerable accession of plants from the fine collection of Mr. F. E. Dixon of Ronaele Manor, Elkina Park, Pennsylvania, and these were used for quite an extensive programme of hybridization. But apart from this there were few additions from outside, and it is to this curious isolation from the main lines of breeding in the rest of the world that the Shaw's Garden plants owe their distinctive interest today.

In England, where the original and main subsequent development took place, there were many famous breeders, of whom Sir Jeremiah Colman of Gatton Park was the most important. He had the good fortune or the wisdom to begin breeding orchids when a young man and thus in his lifetime was able to transform the Nobiles in every respect.

Dendrobium nobile, Ldl., is a very variable species, ranging from pure white to deep reddish purple and with a wide variety of habit and form.

Many varieties are recorded, often bearing the name of the famous collection in which they originated. I have succeeded in assembling forty-two such varieties of which in my opinion 'Harefield Hall' is still the best. Shaw's Garden grows a variety under the name of Dominianum, which is not of particular merit except for an apparent tendency to bloom early, but which is of particular interest as having presumably come from the collection of Mr. Dominy, an English amateur, who raised the first hybrid orchid following upon Darwin's research into pollination, in the year 1856. I believe these to be the only plants of this variety in existence.

To introduce a range of yellow and orange colours upon the basis of the robust constitution of *D. Nobile*, three species have been used: *D. heterocarpum*, Wall., *D. signatum*, Rchb., and *D. Hildebrandii*, Rolfe. The first two species have probably been developed near to their full potential. The third offers possibilities for those who seek character and elegance rather than size and roundness of flower. The best yellow hybrids now have a good clear colour and fair shape and size. Brilliant orange and apricot tones exist of which some have an excellent shape while others, lacking in shape, are exceedingly floriferous.

At a much later date *D. regium*, Prain, was introduced from the Deccan and was at once seized upon by Col-

Dendrobium nobile flowering at Gray Summit in 1953

man for breeding. For this purpose it has three valuable characteristics. First, a very beautiful white throat gives rise to a series of hybrids with this feature in place of the characteristic maroon blotch of *D. nobile* or the chestnut lip of *D. heterocarpum*. Secondly it has a brighter and clearer reddish pink colour than any *nobile* variety; the colour is stable, and has descended to some of its progeny. Finally, it blooms six weeks to two months later than *D. nobile* and thus tends to produce offspring which extend the flowering season. The potential of *D. regium* as a parent had only begun to be exploited at the outbreak of the second world war, and when the war was over it appeared to have vanished from cultivation. Efforts to find it in the Deccan have not been successful: some Kew plants, part of a legacy, are doubtfully true but may prove to be so. After extensive search and world-wide advertisement I found a specimen of what seems to be the real thing, unprized in an amateur's tiny greenhouse in Worthing, England!

The early English and modern Japanese breeders have made extensive use of a miniature species, *D. monile*, Kranzl., to produce a race of small flowered miniature hybrids with *D. nobile* and its allies. These are exceedingly attractive and elegant little plants, often inheriting the fine fragrance of the *monile* parent. They also have a habit of blooming at odd times of the year, and thus providing an agreeable surprize for the owner. I hear that Mr. Tanaka, who is at present working in this field, expects a promising crop of new crosses to flower for the first time this year.

Attempts to use other species for hybridization with *D. nobile* have not met with much success. *D. primulinum*, Ldl., has given to one hybrid, which may be seen in Shaw's Garden, its fine broad cream coloured lip, but this has not proved easily transmissible to later generations. *D. Falconeri*, Hook., produced an exceedingly elegant hybrid, Venus. I have failed to find this in cultivation, but it meets *D. nobile* in an American cross with Lady Colman, now showing bud for the first time with me, and clearly displaying *Falconeri* blood in its slender graceful growth. *D. Wardianum*, Warn., one of the finest of all the species of *Dendrobium*, and promising for breeding because somewhat variable, has proved a most difficult parent. Ronaele, of which Shaw's Garden has a large stock, is its main achievement and has been used by the Garden for subsequent breeding. The splendid *D. Wardianum album*, which comes true from seed, is an even more disappointing parent.

A promising line of breeding for these plants is the crossing of selected fine varieties of the same parentage. It was by this means that Dell Park produced its splendid range of Models, and I understand that the same process at Shaw's Garden with two selected varieties of *Thwaitesiae* has given an interesting range of yellows, including one or two of exceptional character. Quite apart from the use of new species or the further development of some older parents, there is thus a ready means of advance open to the amateur. This would, however, be

greatly facilitated if a kindly cytologist would carry out a series of chromosome counts in *Dendrobium*, using correctly described and identified material.

In the last resort, however, a *Nobile* type *Dendrobium* is a plant for the grower. With a sharply defined annual growth of one pseudobulb, it provides him with the unspeakable smug satisfaction of noting the day when the current year's growth has exceeded in fatness or length or both, that which went before.

Mr. Peter Smithers, D.Phil., of London, England, and Member of Parliament, is an amateur grower of Orchids. He has, for several years, been building a collection of the various hybrids and species of the deciduous *Dendrobiums* with a special effort to obtain and preserve many of the almost extinct hybrids of *D. nobile*. He recently spent several days inspecting the deciduous *Dendrobium* collection here at the Garden and considered it to be one of the finest in the world.

CLIMATRON RECEIVES HIGHEST INTERNATIONAL AWARD FOR ARCHITECTURAL EXCELLENCE

SELECTION of the Climatron as the first American recipient of the $25,000 R. S. Reynolds Award, the largest international award for architectural excellence, was announced April 2 by the American Institute of Architects which conducts the competition.

Director Frits W. Went

In citing architects Joseph D. Murphy and Eugene J. Mackey and Garden Director Frits W. Went for the Climatron, a jury of distinguished architects stated, "the tropical lyricism of the botanical displays seem so successfully carried out by the architects of this structure, that it must be a marvelous experience for the visitor to enter this great space." They added, the Climatron is "sensitively executed and strikingly appropriate to its purpose." The Geodesic dome structure follows principles established about 10 years ago by R. Buckminster Fuller and is the first application of Geodesic engineering for a greenhouse.

The R. S. Reynolds Memorial Award is conferred annually by the AIA on the architect who has designed "a significant work of architecture, in the creation of which aluminum has been an important contributing factor."

The Climatron's Geodesic structure as well as the frame work for its Plexiglas liner are aluminum.

The award was presented formally to Messrs. Murphy, Mackey and Went April 26 at the AIA convention in Philadelphia. Previous Reynolds awards were given for buildings in Spain, Belgium, Australia and Switzerland.

BOOK REVIEW

Trees, Shrubs and Woody Vines of the Southwest, by Robert A. Vines. Illustrated by Sarah Kahlden Arendale, published by University of Texas Press.

THIS book is well worth its rather high price of $25.00 per copy. It will make a perfect gift for any plant lover in the Southwest, but the number of Missouri trees described is so great that it will also be most useful for persons in that State.

More than 1,200 species of native and naturalized woody plants of the Southwestern United States are described. In addition to its general description, each plant is beautifully illustrated by Miss Arendale. Her drawings have been very much reduced in reproduction, and in a few cases, for instance *Haplopappus laricifolius* and *Viburnum rafinesquianum,* have lost in the reproduction. However, in the great majority, these drawings are quite magnificent. They are done with a special technique which brings out the rounded contours of the leaves. With a stippling technique the hairy plants look very hairy. Many of the plants have been drawn from nature, as can be seen, for instance, in the case of the White Fir, which apparently grew at a low altitude and which has abnormal leaves, when compared with a tree growing in its natural surroundings.

These illustrations substitute largely for the lack of keys. It is possible to look through the pictures and thus identify a tree. With the detailed description, it will be possible to positively identify practically every tree in the Southwest.

Also quite valuable are the most informative remarks which can be found with each species. These remarks are concerned with details about the growing of the plant, economic uses, remedies against it (such as poison oak, poison ivy), etc. I have seldom seen so complete a book.

There are certain mistakes, such as, for instance, the altitudinal range of the Engelmann spruce, which is given as from 5,000 to 15,000 feet. Actually, the highest trees do not grow above 12,000 feet. But such mistakes are unimportant. Plant lovers will enjoy this book.

Review by F. W. Went, Director, Missouri Botanical Garden, St. Louis, Missouri.

FRIENDS OF THE GARDEN

FRIENDS of the Garden are working vigorously these days with the aid of more than 100 members who have volunteered to help increase the organization's membership substantially during 1961.

With their contributions to the Garden up 60 per cent in 1960 over 1959, Friends, under the leadership of Harry Wuertenbaecher, Jr., vice-president for membership, are committed to the goal of continuing to enlarge Garden support as much as possible.

An Executive Council was recently appointed by Friends' president, Mrs. William R. Bascom, to promote activities in several directions. Mrs. Curtis Ford, vice-president, and Mrs. James L. Sprunt are council co-chairmen for a new volunteer program now being developed. Mrs. Samuel Libermann and Mrs. Robert M. Smith are chairmen, respectively, of activities and illustrations committees. Other members of the new Council are:

Mrs. John R. Averill, Mrs. J. Bruce Butler, Mrs. Dozier L. Gardner, Mrs. John Raeburn Green, II, Mrs. William J. Hedley, Mrs. Merl C. Kelce, Mrs. Sears Lehmann, Jr., Mrs. Fristoe Mullins, Mrs. Gilbert J. Samuelson, Mrs. Edward F. Schweich and Mrs. James A. Seddon.

"We plan to do more for our mem-

Friends of the Garden officers for 1961 are shown during a recent visit to the Climatron: Mrs. William R. Bascom, president; Mr. Harry Wuertenbaecher, vice-president, membership; and Mrs. Eli M. Strassner and Mrs. Curtis Ford, vice-presidents.

bers—and do ask our members to do more for the Garden," Mrs. Bascom said. Following an intensive membership effort, a kind of "celebration garden party" is tentatively being planned for the fall to be one of the outstanding Garden events of the year.

Mrs. Kay Miller has joined the Garden staff as executive secretary for the Friends.

THROUGH THE GARDEN GATE

THE second annual Garden Gate exhibition and sale will be held May 11 through 13 by the Women's Association of Shaw's Garden in cooperation with Famous-Barr at the firm's Clayton parking lot.

Last year's Garden Gate event was so successful that many supplies were sold out the first day, so members of the Garden Clubs, Herb Society, Women's Association and other volunteers have been busily at work, some of them since last fall, developing plant materials and other supplies for this year's event.

Under the direction of Mrs. J. Bruce Butler, Women's Association president and Garden Gate co-chairmen, Mrs. Arthur H. Fuerbacher, Jr., and Mrs. Bert A. Lynch, Jr., an elaborate selection of plants and garden equipment is being offered for sale as well as the services of an horticulturist and, at specified hours, an authority on flower arrangements.

"Too numerous to mention" are the proper terms to describe the Garden Gate's bounty, but a brief preview of the sale follows. Ground covers, including four kinds of ivy, have been

View of the 1960 Through the Garden Gate Exposition on the Parking Lot, Famous-Barr, Clayton, Missouri. PHOTO P.A.K.

prepared by Mrs. Hazel Knapp; house and terrace plants with, for example, 16 new varieties of coleus from England have been prepared by Mrs. William W. Spivy, and the Ladue Garden Club's project of more than 20,000 annuals and perennials are a sample of the plant materials available.

Mrs. Eric Newman and Mrs. Wayne Bigler have outfitted a straw market and "touch of elegance" booth with hundreds of items and a special feature "antiques for the garden," a category that was sold out within an hour last year, Mrs. Butler reports.

Visitors to the Garden Gate will also appreciate an enlarged Herb Restaurant (sidewalk variety) under the sponsorship of the St. Louis Herb Society.

Most important of all, proceeds from the three-day festival go directly to the benefit of the Missouri Botanical (Shaw's) Garden.

MISSOURI BOTANICAL GARDEN PROGRAMS

SPECIAL SHOWS AND DISPLAYS

African Violet Show, May 6 and 7
Aquarium Society Show, May 13 and 14
St. Louis Horticultural Society Spring Flower Show, May 20 and 21
Rose Show, May 27 and 28

FREE NATURE PROGRAMS at Museum Building for children, aged seven and over, are held every Saturday morning from 10:00 to 11:30 A. M.

May 6 Plants from Historic Times
May 13 Planting Your Garden
May 20 Color Sound Movies
May 27 Shades of the Night

COURSES FOR ADULTS Beginning in May

204 FIELD BOTANY, Spring, 3 sessions, fee $6.00

Saturdays, May 20 and 27, June 3. Start from the Garden, 10:00 A. M. Experimental Greenhouse. Field courses are designed to enable the student to recognize common wild flowers and weeds in the Spring and to understand plants' relationships with their environment. Instructors Dr. E. Anderson, Dr. R. L. Dressler and Mr. Louis Brenner.

A SERIES OF FREE LECTURES ON RESEARCH AT THE GARDEN

Given the First Monday of each Month, 8:00 P. M. in the Museum Building.

CUTAK REPORTS (with slides) on a plant collecting trip to Colombia, South America. Mr. Ladislaus Cutak, May 1.

AROIDS OF TROPICAL AMERICA, Dr. George S. Bunting, June 5.

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SOME FACTS ABOUT SHAW'S GARDEN

The Missouri Botanical (Shaw's) Garden was established in 1859 by Henry Shaw, a St. Louis businessman, to be controlled by a Board of Trustees for the public benefit. The Garden is a non-profit institution which receives no support from the city or state, depending on the income from the Shaw estate supplemented by contributions from the public.

The old stone walls and cast-iron fences, the Linnean House, the Museum Building, the part of the Administration Building which was Shaw's Town House, relocated in the Garden in 1890, and the Tower Grove House, his country home, all date from Mr. Shaw's time. The Main Gate, display and growing greenhouses and most other facilities date from the period immediately following the turn of the century. The Climatron, opened in 1960, is the first of several new buildings planned for the Garden's redevelopment. It is the world's first geodesic dome, fully climate-controlled greenhouse and contains the Garden's tropical collections.

The Garden—70 acres—is open every day of the year (except Christmas and New Year) from 9 A. M. until sundown, the greenhouses 9 A. M. to 5 P. M., the Climatron Monday through Thursday 9 A. M. to 5 P. M., Friday through Sunday 9 A. M. to 9 P. M. Tower Grove House is open daily from 1 P. M. to 4 P. M. (December to March on weekends only). The Display House presents four seasonal displays: November, Chrysanthemums; December, Poinsettias; February, Orchids; Spring, Lilies and other flowers. During the year are other shows, competitions and festivals sponsored by various Garden Clubs and Flower Societies.

Courses in Botany and Horticulture for adults are conducted by the Garden staff. Children's nature studies are provided each Saturday of the year and a special nature program is held during the summer. Information on these activities is published in the BULLETIN or may be had by mail or phone. The Garden maintains a research program through the Henry Shaw School of Botany, Washington University.

In 1926 an Arboretum — 1600 acres — was established at Gray Summit, Missouri. Foot trails and roads pass through the Arboretum and are open to visitors in April and May.

The Garden Administration Building is located at 2315 Tower Grove Ave., and the Garden main entrance is at Tower Grove and Flora Place. The entrance at Tower Grove and Cleveland Avenue is also open to the public. The Garden is served by both the Sarah (No. 42) and the Park-Southampton (No. 80) city bus lines.

Persons interested in helping to support the Garden and taking part in Garden activities are urged to do so through the "Friends of the Garden". Information may be obtained from the Main Gate or by mail or phone.